LISTING OF THE CLAIMS

Please amend claim 1. This listing of claims will replace all prior versions, and listings, of claims in the application:

CLAIMS

What is claimed is:

1. (Currently Amended) A semiconductor laser, comprising:

a first optical gain element that generates a first light beam having a first optical frequency;

a second optical gain element that generates a second light beam having a second optical frequency;

an optical frequency mixer that is coupled to said first and second gain elements and mixes said first and second light beams to generates a polarization wave at a third optical frequency; and

a near-field phase grating that phase modulates the polarization wave to couple[~~s~~] a power from the polarization wave to an electromagnetic wave that propagates at the third optical frequency.

2. (Original) The laser of claim 1, wherein the third optical frequency is in the mid-infrared, long-infrared or Terahertz regions.

3. (Original) The laser of claim 1, wherein said optical frequency mixer includes a waveguide optically coupled to said first and second gain elements.

4. (Original) The laser of claim 1, wherein the electromagnetic wave propagates in a direction essentially perpendicular to a propagation direction of the first and second light beams.

5. (Original) The laser of claim 1, wherein the semiconductor laser is fabricated with group III-V material.

6. (Previously Presented) A semiconductor laser, comprising:

a first optical gain element that generates a first light beam having a first frequency;

a second optical gain element that generates a second light beam having a second frequency;

mixing means for mixing the first and second light beams to create a polarization wave at a third optical frequency, and;

phase modulation means for phase modulating the polarization wave for coupling a power of the polarization wave to an electromagnetic wave that propagates at the third optical frequency.

7. (Original) The laser of claim 6, wherein the third optical frequency is in mid-infrared, long-infrared or Terahertz regions.

8. (Original) The laser of claim 6, wherein said mixing means includes a waveguide for mixing said first and second light beams.

9. (Original) The laser of claim 6, wherein the electromagnetic wave propagates in a direction essentially perpendicular to a propagation direction of the first and second light beams.

10. (Original) The laser of claim 6, wherein the semiconductor laser is fabricated with group III-V material.

11. (Previously Presenteded) A method for operating a semiconductor laser, comprising:

generating a first light beam having a first optical frequency;

generating a second light beam having a second optical frequency;

mixing the first and second light beams to create a polarization wave at a third optical frequency, and,

phase modulating the polarization wave to couple a power of the polarization wave to an electromagnetic wave that propagates at the third optical frequency.

12. (Original) The method of claim 11, wherein the third optical frequency is in the mid-infrared, long-infrared or Terahertz regions.

13. (Original) The method of claim 11, wherein the first and second light beams are mixed in a waveguide.

14. (Original) The method of claim 11, wherein the electromagnetic wave propagates in a direction essentially perpendicular to a propagation direction of the first and second light beams.